

## Sharing knowledge...

**Shift your horizon.**

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### Improving optical properties of polymers

The optical properties of polymers are an important differentiator in a wide range of applications, from plastic products and packaging to glazing products for the automotive and construction industries. Gloss, clarity and haze are three important optical properties that determine how a polymer material will be used in different applications.

Optical properties are caused by the scattering of visible light. This scattering is determined by the semi-crystalline morphology (orientation, spherulite size distribution, crystallinity, birefringency) and the blend morphology (particle size distribution, difference in the refraction index between the dispersion and matrix phase) of the polymer. The morphology itself is influenced by the processing parameters used to create the end product (temperature, cooling speed and shear speed). The physical condition of the surface, particularly the surface roughness, is a very important factor as well.

#### What can we do for you?

We can provide the full spectrum of analytical testing methods to measure and characterise morphology and surface roughness, and determine the relation to light scattering of a material. This enables us to estimate the optical properties of your polymers. The resulting information can help you determine the root-cause and guide you in making modifications to improve the optical properties of your material.

Gloss, clarity and haze are measured according to current American Society for Testing and Materials (ASTM) norms. Surface roughness is measured using White light interferometry, Atomic Force Microscopy and Scanning Electron Microscopy (SEM). The morphology is determined using state-of-the-art methods, like light, electron or surface probe microscopy, X-ray diffraction, optical spectroscopy, solid state NMR and thermal analysis.

We have broad experience in an array of applications. For instance, we understand the subtle differences of the gloss of diverse automotive parts like bumpers or dashboard panels. We have investigated the gloss and matteness of paint layers on body parts, such as body panels and bezels, after the injection molding process. Our expertise also includes determining the clarity and transparency of polymers for plastic beer cups used at rock concerts and other similar applications.

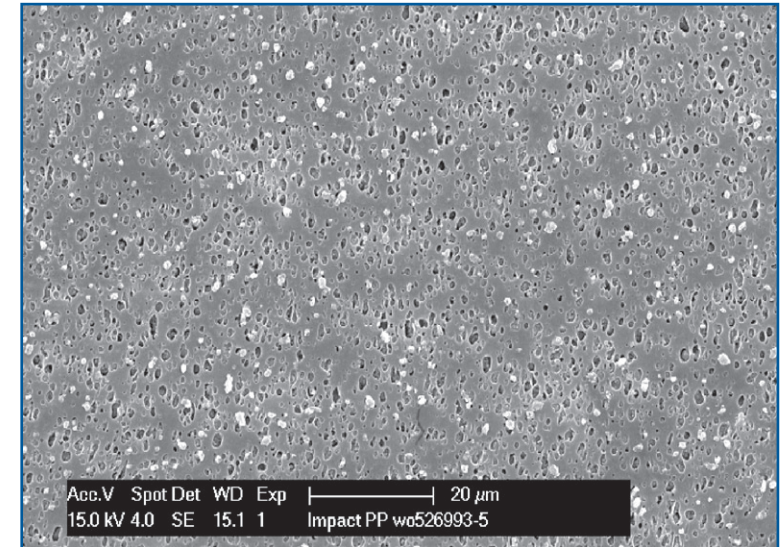
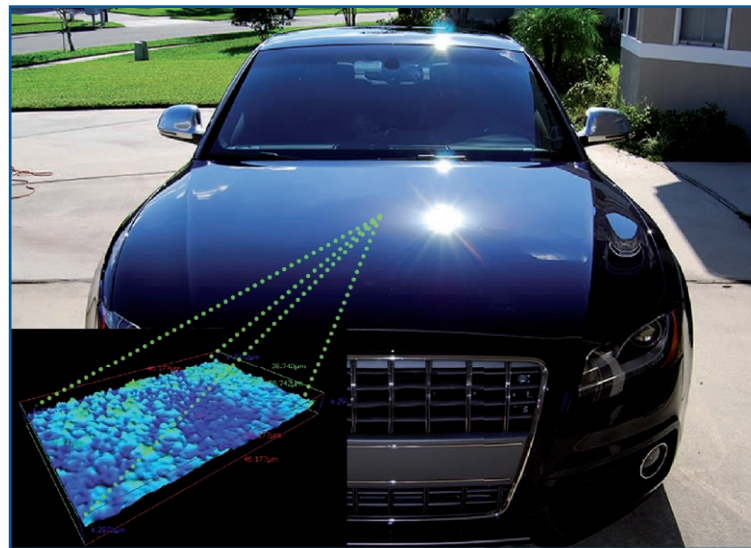
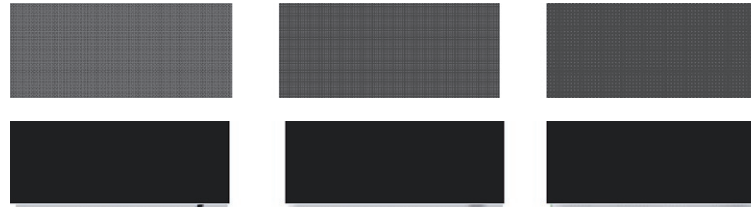
At DSM Resolve, you benefit from the latest morphological and optical analytical techniques, carried out by a skilled professional team with long experience in analysing and interpreting all aspects of the optical properties of polymers.

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**Stretch your thinking in polymers**

DSM Resolves understands the complete continuum of polymers - from research and development to production and end of life disposal. Based on decades of experience in materials analysis and processing, chemical engineering and safety testing, as well as product enhancement and polymer recycling issues. Our services can help you improve the way you are currently producing or using polymer.



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